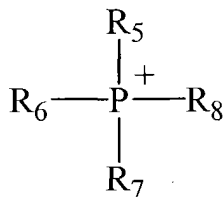
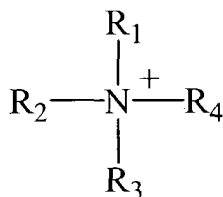
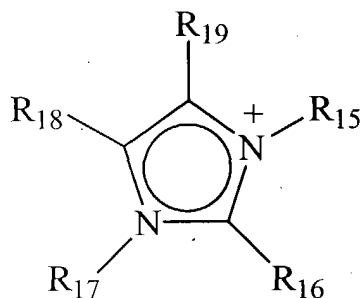
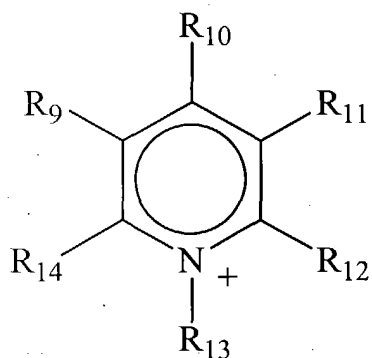


**THAT WHICH IS CLAIMED:**

1. A catalyst system comprising an ionic liquid dispersed on a support having an average pore diameter greater than about 225 Å.
2. A catalyst system in accordance with claim 1 wherein said support has a surface area less than about 700 m<sup>2</sup>/gram.
3. A catalyst system in accordance with claim 1 wherein said support is non-crystalline.
4. A catalyst system in accordance with claim 1 wherein said support is non-crystalline and has a surface area less than about 700 m<sup>2</sup>/gram.
5. A catalyst system in accordance with claim 1 wherein said support is silica.
6. A catalyst system in accordance with claim 1 wherein said ionic liquid comprises a cation and an anion; wherein said cation is selected from the group consisting of ions defined by the formulas:





and combinations of any two or more thereof, wherein:

R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, R<sub>5</sub>, R<sub>6</sub>, and R<sub>7</sub> are selected from saturated and unsaturated hydrocarbons containing from 1 to 7 carbon atoms per molecule;

R<sub>4</sub>, R<sub>8</sub>, R<sub>9</sub>, R<sub>10</sub>, R<sub>11</sub>, R<sub>12</sub>, R<sub>13</sub>, R<sub>14</sub>, R<sub>15</sub>, R<sub>16</sub>, R<sub>17</sub>, R<sub>18</sub>, and R<sub>19</sub> are selected from saturated and unsaturated hydrocarbons containing from 1 to 7 carbon atoms per molecule, and hydrogen; and

wherein said anion is selected from the group consisting of halides of: Group IIIA metals, copper, zinc, iron and phosphorus.

7. A catalyst system in accordance with claim 6 wherein said anion is selected from the group consisting of AlCl<sub>4</sub><sup>-</sup>, Al<sub>2</sub>Cl<sub>7</sub><sup>-</sup>, Al<sub>3</sub>Cl<sub>10</sub><sup>-</sup>, GaCl<sub>4</sub><sup>-</sup>, Ga<sub>2</sub>Cl<sub>7</sub><sup>-</sup>, Ga<sub>3</sub>Cl<sub>10</sub><sup>-</sup>, CuCl<sub>2</sub><sup>-</sup>, Cu<sub>2</sub>Cl<sub>3</sub><sup>-</sup>, Cu<sub>3</sub>Cl<sub>4</sub><sup>-</sup>, ZnCl<sub>3</sub><sup>-</sup>, FeCl<sub>3</sub><sup>-</sup>, FeCl<sub>4</sub><sup>-</sup>, Fe<sub>3</sub>Cl<sub>7</sub><sup>-</sup>, PF<sub>6</sub><sup>-</sup>, and BF<sub>4</sub><sup>-</sup>.

8. A catalyst system in accordance with claim 6 wherein said ionic liquid has the formula  $R_1R_2R_3NH^+Al_2Cl_7^-$ .

9. A catalyst system in accordance with claim 6 wherein said ionic liquid has the formula  $(CH_3)_3NH^+Al_2Cl_7^-$ .

10. A catalyst system in accordance with claim 1 wherein a Group VIII metal compound is dispersed in said ionic liquid.

11. A catalyst system in accordance with claim 10 wherein said Group VIII metal compound comprises a platinum compound.

12. A process comprising:

a) contacting, under conversion conditions, a hydrocarbon feed stream comprising a  $C_5$  paraffin and an initiator with a catalyst system comprising an ionic liquid dispersed on a support; and

b) withdrawing a product stream comprising a  $C_4$  paraffin and at least one  $C_6$  paraffin.

13. A process in accordance with claim 12 wherein said support has an average pore diameter greater than about 225 Å.

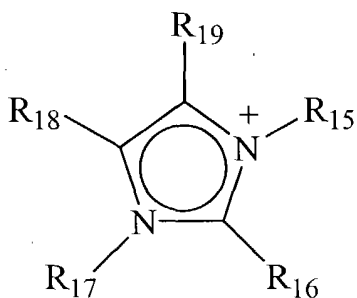
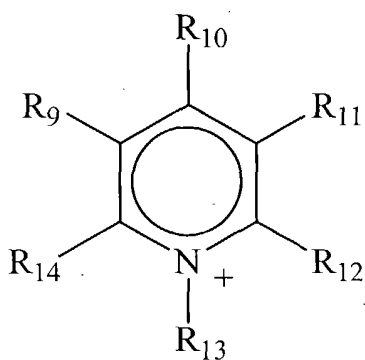
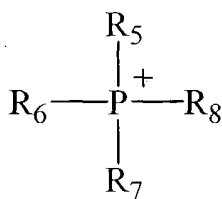
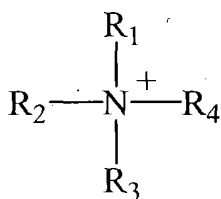
14. A process in accordance with claim 12 wherein said support has a surface area less than about 700 m<sup>2</sup>/gram.

15. A process in accordance with claim 12 wherein said support is non-crystalline.

16. A process in accordance with claim 12 wherein said support is non-crystalline, has an average pore diameter greater than about 225 Å, and has a surface area less than about 700 m<sup>2</sup>/gram.

17. A process in accordance with claim 12 wherein said support is silica.

18. A process in accordance with claim 12 wherein said ionic liquid comprises a cation and an anion; wherein said cation is selected from the group consisting of ions defined by the formulas:



and combinations of any two or more thereof, wherein:

$R_1, R_2, R_3, R_5, R_6$ , and  $R_7$  are selected from saturated and unsaturated hydrocarbons containing from 1 to 7 carbon atoms per molecule;

$R_4, R_8, R_9, R_{10}, R_{11}, R_{12}, R_{13}, R_{14}, R_{15}, R_{16}, R_{17}, R_{18}$ , and  $R_{19}$  are selected from saturated and unsaturated hydrocarbons containing from 1 to 7 carbon atoms per molecule, and hydrogen; and

wherein said anion is selected from the group consisting of halides of: Group IIIA metals, copper, zinc, iron and phosphorus.

19. A process in accordance with claim 18 wherein said anion is selected from the groups consisting of  $AlCl_4^-$ ,  $Al_2Cl_7^-$ ,  $Al_3Cl_{10}^-$ ,  $GaCl_4^-$ ,  $Ga_2Cl_7^-$ ,  $Ga_3Cl_{10}^-$ ,  $CuCl_2^-$ ,  $Cu_2Cl_3^-$ ,  $Cu_3Cl_4^-$ ,  $ZnCl_3^-$ ,  $FeCl_3^-$ ,  $FeCl_4^-$ ,  $Fe_3Cl_7^-$ ,  $PF_6^-$ , and  $BF_4^-$ .

20. A process in accordance with claim 18 wherein said ionic liquid has the formula  $R_1R_2R_3NH^+Al_2Cl_7^-$ .

21. A process in accordance with claim 18 wherein said ionic liquid has the formula  $(CH_3)_3NH^+Al_2Cl_7^-$ .

22. A process in accordance with claim 12 wherein said hydrocarbon feed stream comprises at least 50 weight-% isopentane, based on the total weight of said hydrocarbon feed stream.

23. A process in accordance with claim 12 wherein said hydrocarbon feed stream comprises in the range of from about 50 to about 95 weight-% isopentane, based on the total weight of said hydrocarbon feed stream.

24. A process in accordance with claim 12 wherein said hydrocarbon feed stream comprises in the range of from about 80 to about 98.5 weight-% isopentane, based on the total weight of said hydrocarbon feed stream.

25. A process in accordance with claim 12 wherein said conversion conditions include a temperature in the range of from about 100°F to about 1000°F.

26. A process in accordance with claim 12 wherein said conversion conditions include a temperature in the range of from about 140°F to about 250°F.

27. A process in accordance with claim 12 wherein said conversion conditions include a temperature in the range of from about 150°F to about 220°F.

28. A process in accordance with claim 12 wherein said C<sub>4</sub> paraffin of said product stream is isobutane and said C<sub>6</sub> paraffin of said product stream is a hexane isomer.

29. A process in accordance with claim 12 wherein said initiator is selected from the group consisting of: 1) an olefin having in the range of from 2 to 20 carbon atoms per molecule, 2) an alkyl halide wherein said alkyl halide has in the range of from 2 to 20 carbon atoms per molecule, and combinations thereof.